California
Energy Commission

Electric Program Investment Charge 2018 – 2020 Triennial Investment Plan

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EPIC Investment Plan Stakeholder Workshop
California Public Utilities Commission
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Critical Climate & Energy Milestones

- California's pursuit of a low-carbon future hits a critical milestone in 2030.
  - The Clean Energy and Pollution Reduction Act sets targets for energy efficiency and renewable generation for 2030.
  - SB 32 updated the Global Warming Solutions Act to require GHG reductions of 40 percent below 1990 levels by 2030.

- To reach these targets, the pace of technological progress in the energy sector will need to increase exponentially.

- California's leaders are developing and implementing policies to create the needed "market pull" for clean energy technologies.

GHG Reductions Require Significant Energy System Transformation

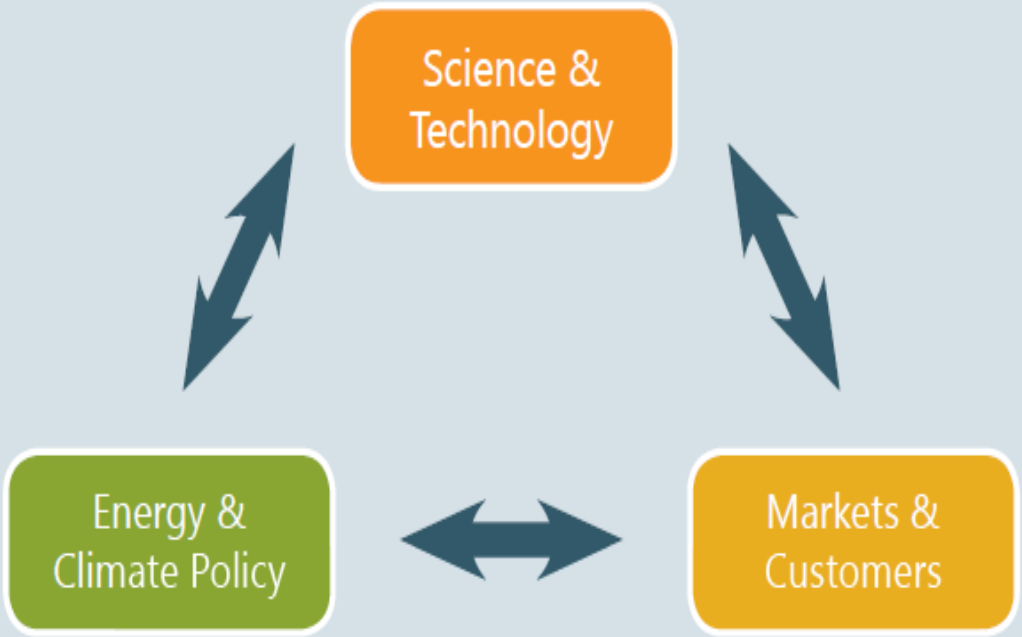
Progressive GHG and Renewable Portfolio Goals

- Intermittent Renewables vs Dispatchable Generation
- Increased Distributed vs. Central Station Generation
- Predictable vs Transactive Loads
- Incorporating Two-way Distribution Flow
- Maximizing Electric/Alt. Fuel vs Gasoline/Diesel
- Electrification of Industry, Commercial, Residential

Addressing Climate Risk, Resiliency, Safety, Costs, and Aging Infrastructure

EPIC Provides the Technology Push

The EPIC program seeks to optimize linkages between technologies, markets, and policies to drive the electricity sector's transformation.



EPIC Program Areas

Applied Research and Development

Applied Research and Development includes activities to support pre-commercial technologies and approaches at applied lab-level or pilot-level stages

Technology Demonstration and Deployment

Technology Demonstration and Deployment involves installation and operation of pre-commercial technologies or strategies at a scale that will reflect actual operating, performance, and financial characteristics and risks

Market Facilitation

Market Facilitation supports strategic initiatives at key stages of a new technology's development to increase the likelihood of market adoption and commercial success

Investment Plan Development

The EPIC 2018 – 2020 Investment Plans were developed through an open process with multiple rounds of stakeholder engagement

The four EPIC administrators held three joint workshops to obtain stakeholder feedback on the proposed plans:

- PG&E Hosted – March 9, 2017 in San Francisco
- CEC Hosted – March 14, 2017 in Sacramento
- SCE Hosted – March 24, 2017 in Westminster

Comments were summarized and responded to in each respective Administrator's Investment Plan.

Investment Plan Development

In addition to the scoping workshops, five topical workshops were held to inform the Investment Plan development

- Distributed Energy Resources
  - March 13, 2017
- Incorporating Community Focused Equity in Research Funding
  - March 20, 2017 in Fresno
  - March 27, 2017 in Los Angeles
- Climate Science Research
  - March 16, 2017
  - April 11, 2017

Comparison Exhibit

On September 1, 2017 the EPIC Administrators submitted to the CPUC, a Joint Comparison Matrix of the EPIC Proposed 2018 – 2020 Investment Plans

The Comparison Matrix provides an apples-to-apples comparison of each administrator's proposal, including:

- Scope and focus of the project/initiative
- Policy and legislation drivers for the project/initiative
- Applicable coordination with CPUC proceedings
- How the project or initiative avoids duplication

The EPIC Administrators are committed to on-going collaboration to ensure that projects/funding initiatives are complementary and not duplicative

California Energy Commission's EPIC 2018 – 2020 Investment Plan

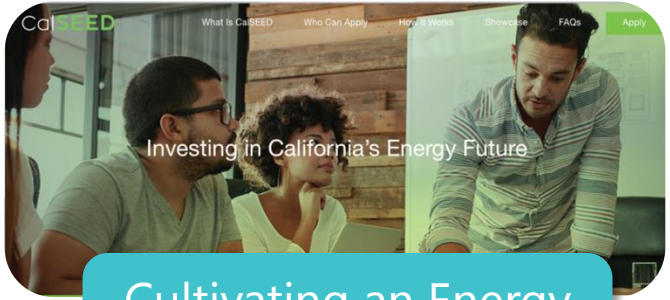
Preparing for the Next Stage of the Electricity System's Transformation

Affordable Zero Net Energy Buildings

Building a Resilient Electricity System

Creating a Market for Energy Storage

Taking Action at the Local Levels



Cultivating an Energy Innovation Ecosystem

Disadvantaged Community Efforts

Energy Commission is committed to expanding benefits from EPIC funded projects to Disadvantaged Communities (DACs)

Funding Strategies:

- Target 25 percent of TD&D funds to projects located in and benefiting DACs
- Solicitation preference points
- Funding set-asides

Outreach and engagement:

- DAC focused workshops for Investment Plan development
- Continued outreach via attending events, outreach materials in different languages, and how-to-apply presentations
- CEC's SB350 Proceeding
    - Low-Income Barriers Study – December 2016
    - Low-Income Barriers Study Implementation – ongoing

EPIC 3 Strategic Themes

1. Advance Technology Solutions for Continued Energy Savings in Buildings and Facilities
2. Accelerate Widespread Customer Adoption of Distributed Energy Resources
3. Increase System Flexibility and Stability from Low-Carbon Resources
4. Increase the Cost-competitiveness of Renewable Generation
5. Create a Statewide Ecosystem for Incubating New Energy Innovations
6. Maximize Synergies in the Water-Energy-Food Nexus
7. Develop Tools and Analysis to Inform State Energy Policy and Planning
8. Catalyze Clean Energy Investment in Underrepresented and Disadvantaged Communities

1 Advance Technology Solutions for Continued Energy Savings in Buildings and Facilities

This theme focuses on technology advancements to drive cost and performance improvements of energy efficiency components:

- Accelerate adoption and increase cost effective options in existing and future buildings/industries.
  - Solid state lighting features, cost effective building envelopes, standardized control platforms, plug load controls
  - Factory built homes
- Focus on hard-to-reach market sectors
  - Including disadvantaged communities
- Transition from traditionally natural gas equipment to electricity.
  - Climate appropriate, high efficiency heat pumps
  - Industrial decarbonization strategies
- Looking towards the future
  - Transition to DC applications

2 Accelerate Widespread Customer Adoption of Distributed Energy Resources

Theme Highlights:

- Cost-effective and sustainable retrofits to highly energy efficient buildings and communities
- Advancing microgrids to the tipping point of commercial adoption.
- Improving the business proposition of integrated distributed storage
- Developing and demonstrating the most promising Advanced Energy Communities with a second EPIC Challenge

3 Increase System Flexibility and Stability from Low-Carbon Resources

Theme Highlights:

- Accelerate broad adoption of automated DR capabilities to provide grid flexible response services
- Enable electric vehicle-based grid services
- Increase value of DERs and renewables to the transmission and distribution systems
- Defining and demonstrating locational benefit and best configurations of grid-level energy storage

4 Increase the Cost-competitiveness of Renewable Generation

This theme seeks technology advancements needed to open new market opportunities for renewables:

- Increase the economic potential of renewables within California
- Enable renewables to compete in grid service markets
- Develop technologies whose unique attributes can create new uses and markets for renewables

5 Create a Statewide Ecosystem for Incubating New Energy Innovations

This theme seeks to leverage, align and expand California's existing assets to build a more efficient statewide energy innovation ecosystem that will:

- Provide a more systematic approach to move new energy inventions through the "technological valley of death"
- Overcome barriers to broader and more diverse clean energy entrepreneurship

6 Maximize Synergies in the Water-Energy-Food Nexus

This theme focuses on technology advancements to reduce the energy intensity in water supply and treatment, reduce energy and/or water use in the food and agriculture sector and optimize management practices intended to accomplish the following:

- Develop, test and demonstrate low energy intensity treatment processes for conventional and non-conventional water sources (disinfection, system optimization)
- Develop and demonstrate strategies and management practices to reduce carbon intensity of wastewater treatment
- Demonstrate cost-effective options for water and energy efficiency in agriculture and food processing to reduce carbon intensity

7 Develop Tools and Analysis to Inform State Energy Policy and Planning

This theme focuses on creating actionable tools and scientific analysis to inform policymakers and other stakeholders by:

- Identifying pathways for achieving California's energy and climate goals
- Increasing the resiliency of the electricity system to climate change and extreme weather events
- Evaluating strategies to mitigate the impacts of the electricity system on the environment and public health and safety

8 Catalyze Clean Energy Investment in Underrepresented and Disadvantaged Communities

This theme seeks to increase investment, deployment, and adoption of clean energy innovations in low-income and disadvantaged communities by:

- Developing data-driven tools for energy projects targeting disadvantaged communities
- Scaling-up emerging technology solutions best suited to the needs of disadvantaged communities
- The Energy Commission is committed to allocate 25 percent of Technology Demonstration and Deployment funds for projects located in disadvantaged communities

Questions